Randomized controlled evaluation of an early intervention to prevent post-rape psychopathology

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Abstract

A randomized between-group design was used to evaluate the efficacy of a video intervention to reduce post-traumatic stress disorder (PTSD) and other mental health problems, implemented prior to the forensic medical examination conducted within 72 h post-sexual assault. Participants were 140 female victims of sexual assault (68 video/72 nonvideo) aged 15 years or older. Assessments were targeted for 6 weeks (Time 1) and 6 months (Time 2) post-assault. At Time 1, the intervention was associated with lower scores on measures of PTSD and depression among women with a prior rape history relative to scores among women with a prior rape history in the standard care condition. At Time 2, depression scores were also lower among those with a prior rape history who were in the video relative to the standard care condition. Small effects indicating higher PTSD and Beck Anxiety Inventory (BAI) scores among women without a prior rape history in the video condition were observed at Time 1. Accelerated longitudinal growth curve analysis indicated a video × prior rape history interaction for PTSD, yielding four patterns of symptom trajectory over time. Women with a prior rape history in the video condition generally maintained the lowest level of symptoms.
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Introduction

Data from nationally representative samples have estimated that 12–15% of women in the US report being raped at some point in their lives (Resnick, Kilpatrick, Dansky, Saunders, & Best, 1993; Tjaden & Thoennes, 1998) and that an estimated 683,000 women experience rape each year (Kilpatrick, Edmunds, & Seymour, 1992). Rape and other sexual assault are also prevalent among adolescents, with contact sexual assault experienced by 7–13% of adolescent girls (Ageton, 1983; Kilpatrick et al., 2000). Compared to nonvictims, women who experience rape are at a significantly increased risk for mental health problems that include

post-traumatic stress disorder (PTSD), depression, drug, alcohol, and nicotine use and abuse, and other anxiety disorders and health risk behaviors (Kessler, Sonnega, Bromet, Hughes, & Nelson, 1995; Kilpatrick, Acierno, Resnick, Saunders, & Best, 1997; Kilpatrick et al., 2003; Resick, 1993; Resnick et al., 1993; Steketee & Foa, 1987).

Rape-related PTSD is prevalent. Rothbaum, Foa, Riggs, Murdock, and Walsh (1992) found that 94% of rape victims who reported to police or other authorities met symptom criteria for PTSD at 2 weeks post-rape and 50% continued to meet symptom criteria 3 months later. Findings from epidemiological studies indicate that rape or completed sexual assault, as compared to other traumatic events, is associated with greatest risk of PTSD (Kessler et al., 1995; Kilpatrick et al., 1989; Norris, 1992; Resnick et al., 1993).

Rape also results in significant levels of depression, particularly during the weeks following victimization (Atkeson, Calhoun, Resick, & Ellis, 1982; Kilpatrick, Resick, & Veronen, 1981; Resick, 1993; Resick & Veronen, 1981; Steketee & Foa, 1987). Frank and Stewart (1984) found that approximately 43% of rape victims met criteria for depression when assessed within 1 month post-rape. Moreover, the co-occurrence of depression and PTSD is common, ranging from one-third to one-half of those with PTSD (Kessler et al., 1995) meeting criteria for major depression. In a longitudinal study of victims of a range of traumatic events, Shalev et al. (1998) found that 30% had PTSD at 1 month post-event and 17.5% met criteria at 4 months. Among those with PTSD, over 40% met criteria for depression at each time point.

The intensity of acute distress, including peri-traumatic panic reactions (Bryant & Panasetis, 2001; Galea et al., 2002), dissociation symptoms (Ozer, Best, Lipsey, & Weiss, 2003), and physiological arousal as measured by heart rate within hours or days of a traumatic event (Bryant, Harvey, Guthrie, & Moulds, 2000; Shalev et al., 1998; for an exception see Blanchard, Hickling, Galovski, & Veazey, 2002), has been found to be a significant predictor of PTSD. These findings are consistent with learning and cognitive models of PTSD (e.g., Foa & Kozak, 1986; Kilpatrick, Resick, & Veronen, 1981) and depression (Kilpatrick, Veronen, & Resick, 1977; Lewinsohn, 1974). Thus, intensity of acute distress could facilitate conditioned anxiety and secondary avoidance, resulting in reduced reinforcement (depression) or pathological fear structure (PTSD).

Meta-analytic studies across a range of different types of traumatic events indicate that other risk factors for PTSD and other psychopathologies observed across studies include prior exposure to traumatic events, prior adjustment (Brewin, Andrews, & Valentine, 2000; Ozer et al., 2003), low socioeconomic status, and low social support (Brewin et al., 2000). Such risk factors may be important to control when evaluating the potential impact of interventions targeting PTSD or other mental health problems following exposure to an extreme stressor such as rape.

Because rape victims may suffer acute physical injury during assaults, they should receive immediate medical care to treat acute injuries and to prevent sexually transmitted diseases (STDs) or possible rape-related pregnancy (Koss & Heslet, 1992). Standardized protocols are available to address medical and forensic needs of rape victims who report the crime to police or other authorities (Ahrens et al., 2000). For example, Resnick et al. (2000) found that 26% of all women who experienced rape as adults received medical care, with the majority receiving treatment within the first few days after assault. Those who received care were more likely to report fear of death or injury during assault and receipt of injury, characteristics that have been associated with increased risk of later psychopathology. Thus, although not all rape victims receive immediate medical care, those who receive care appear to be at an increased risk of mental health difficulties including PTSD.

Although it has not been formally used as such, the routine forensic rape examination presents a clear opportunity to provide intervention for sexual assault victims who are at high risk for PTSD and other mental health difficulties. Given the high number of women and adolescent girls who are affected by sexual assault and rape each year, the associated increased risk of PTSD and depression, and data indicating associations between acute and later distress, effective treatments at this point of care might reduce later problems in functioning. In addition, for some women and girls who do not seek subsequent treatment it may be the only opportunity to provide such services.

The possibility of reducing risk for significant mental health problems via early intervention following rape is an important area of research. Previous studies have predominantly evaluated early interventions administered in the first few weeks post-assault (Foa, Hearst-Ikeda, & Perry, 1995; Kilpatrick & Veronen, 1984) as opposed to hours post-assault (e.g., at the standardized forensic examination room). Considering the

former group of studies, Kilpatrick and Veronen (1984) found no significant benefit among rape victims who received a 4–6 h early cognitive behavioral skills-based intervention delivered at 6–21 days post-rape compared to a control condition. Foa et al. (1995) found a brief multi-session intervention that included both imaginal and in vivo exposure effective, at least in the short term, with 20 women who were less than 1 month post-assault (including rape). Results indicated that significantly fewer subjects in the treatment group still met PTSD criteria at post-treatment than those in an assessment group, but no differences were noted in terms of PTSD criteria at a 5.5-month assessment point. A more recent study by Foa, Zoellner, and Feeny (2006) with a sample of recent sexual and physical assault victims receiving treatment at an average of 1 month post-assault found that a multi-session early intervention based on cognitive and behavioral principles showed some efficacy relative to supportive counseling (but not an assessment-only condition) in the short term. Results did not show clear long-term benefits.

Based on findings that indicate that recent rape victims are at high risk of PTSD, major depression, and comorbid problems (e.g., drug and alcohol abuse, Kilpatrick et al., 1997, 2000), we developed and evaluated an early intervention designed to reduce the risk for these mental health problems. The intervention was unique in terms of a secondary prevention approach in that it was delivered as a videotape within hours of assault and prior to the post-rape forensic medical examination, and it was specifically designed both to help prepare women for the examination itself and to provide instruction in adaptive coping strategies to reduce dysfunctional avoidance. The video did not include any imaginal exposure component related to describing the assault incident.

We have previously reported findings related to the potential impact of the intervention on drug abuse (Acierno, Resnick, Flood, & Holmes, 2003). Data indicated that women in the video group were significantly less likely to meet criteria for marijuana abuse than women receiving standard care at an assessment that took place approximately 6 weeks post-rape. We also reported findings from the time of the forensic medical examination within a sample of 205 women, 97 of whom were in the video condition and 108 who received standard care (Resnick, Acierno, Kilpatrick, & Holmes, 2005). These data indicated a greater decrease in pre- to post-examination Subjective Units of Distress (SUDs) ratings among women in the video vs. nonvideo groups. Finally, Resnick et al. (2005) reported that among rape victims with a prior history of rape, a probable diagnosis of PTSD based on the PTSD symptom scale self-report (PSS-SR; Foa, Riggs, Dancu, & Rothbaum, 1993) was significantly lower at 6 weeks post-rape among women and adolescent girls who were in the video condition than among those in the standard care condition.

In contrast to the 2005 report, the current report presents comprehensive data on standardized continuous measures of PTSD, depression, and general anxiety assessed at short- and long-term study follow-up assessments targeted for 6 weeks and 6 months post-rape among the full follow-up sample of 140 women who completed at least one assessment. The current report further examines the role of a prior history of rape as a potential moderator of the impact of the intervention on PTSD, depression, and other anxiety over time, controlling for potentially critical risk factors based on the empirical literature that included acute distress and effects of economic resources. Finally, both regression analyses and growth curve modeling were used to evaluate the functioning over time.

Method

Participants

Eligible participants were women and adolescent girls aged 15 years or older who were victims of sexual assault within the previous 72 h and participated in a medical rape examination designed to treat medical concerns and to gather forensic evidence related to rape or suspected rape. All participants were recruited when they presented for forensic examinations at a major Southeastern academic medical center. Individuals who could not provide informed consent to participate in the study (e.g., those with mental retardation, adolescents without a parent present, those with serious injury or interfering health condition, intoxication, or extreme distress that would interfere with the ability to attend to information about the study as assessed by the medical staff and project assistant on site) were considered ineligible. Informed consent was obtained by a
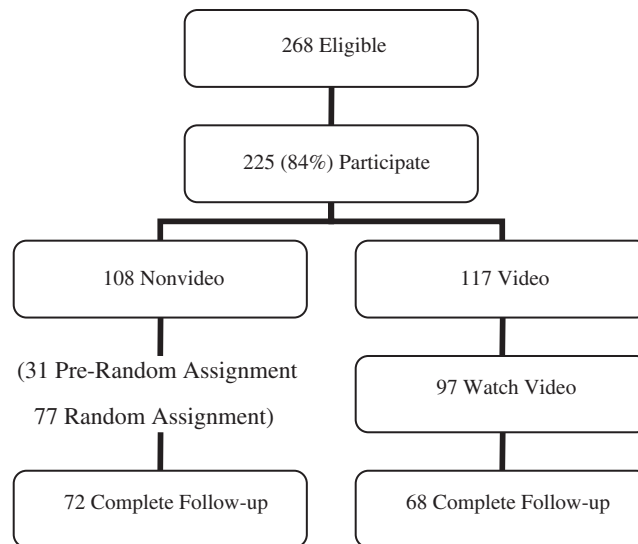
Fig. 1. Participant flow chart.

specially trained project assistant at the time of the initial medical examination and again at the first study follow-up interview. Procedures were approved by the medical center Institutional Review Board.

A flow chart summarizing numbers of participants recruited into the study and completing follow-up assessments is contained in Fig. 1. Of the 268 eligible participants, 225 (84%) agreed to participate. Of the 225 recruited to participate, 108 were assigned to the nonvideo standard treatment and 117 were assigned to the video condition, of whom 97 (83%) agreed to see the video and watched more than half of the video content (15 participants chose not to watch the video and 5 watched less than half), as observed and recorded by an on-site project assistant. Thus, at the time of the initial examination, 205 participants (97 video, and 108 nonvideo) completed assigned conditions. There were no significant differences in terms of age, race, or marital status between: (a) women who were recruited into the study vs. declined participation, (b) participants in the video vs. nonvideo condition, and (c) among women in the video condition, those who watched vs. did not watch most/all of the video (these women also did not differ with regard to pre-examination ratings of SUDs on a scale of 0–100).

As depicted in the flow chart, 31 consecutive participants were assigned to the nonvideo group at the beginning of the study, while development of the video was being completed. Following completion of the video, the remaining participants were randomly assigned to the condition. Those presenting for medical care on nonprime dates of the month were assigned to the video condition. Those receiving care on a prime date (1, 3, 5, etc.) were assigned to the nonvideo treatment condition. As a result, project assistants were aware of the designated study condition prior to recruiting participants. Comparison of the nonrandomly assigned participants with those who were randomized to the nonvideo condition indicated that there were no differences in terms of age, race, or marital status, percentage completing at least one follow-up (22/31 [71%] pre-randomization and 50/77 [65%] random assignment) or SUDs rating given prior to the examination. Therefore, these participants were included in the overall comparison group sample. Analyses were also conducted separately using only participants from the randomized standard care and intervention groups to evaluate whether the pattern of results differed when pre-random assignment participants from the standard care group were excluded.[1]

A total of 140 (68.3%; 68 video and 72 nonvideo) of the initial group of 205 women and girls completed at least one of the two planned follow-up assessments at a separate outpatient office building at the Medical Center: a Time 1 assessment targeted at 6 weeks post-rape ($N = 123$; 61 video/62 nonvideo) and a Time 2

[1]Analyses restricted to participants in both the standard care and video groups who were randomly assigned to the condition yielded the same pattern of findings and significant predictors. The results presented here are based on the full sample including those in the standard care group who were recruited prior to the existence of the video and random assignment to condition.

assessment targeted at 6 months post-rape ($N = 128$; 62 video/66 nonvideo). Sixty-seven percent of those in the nonvideo condition completed at least one follow-up as compared to 70.1% of those in the video condition. Participants in the follow-up assessments did not differ across conditions, demographic characteristics, or pre-examination SUDS ratings compared to those who did not complete follow-up. Further, comparisons of the 68 participants in the video and 72 participants in the nonvideo group who completed at least one follow-up assessment indicated no significant differences in age, race, or marital status. Demographic characteristics are displayed in Table 1. Those in the video group reported a higher average distress rating prior to the rape examination than did participants in the nonvideo group ($M = 83.03$, $SD = 22.77$ vs. $M = 70.46$, $SD = 28.48$, $F(1, 134) = 8.02$, $p < .01$). Based on these differences we statistically controlled for pre-examination SUDs ratings in subsequent analyses.

Participants in the video intervention and standard services groups were compared in terms of whether or not they reported receipt of counseling from a physician, psychiatrist, psychologist, counselor, or social worker for emotional or psychological problems since the rape. The groups did not differ significantly on this variable (31.3% of the video group vs. 43.1% of the nonvideo group; $\chi^2 (1, N = 139) = 1.56$, $p = .21$), suggesting that receipt of outside services was unlikely to confound study results.

Intervention conditions

Standard services: Standard services involved the completion of a forensic rape examination performed by a nurse and physician trained in the conduct of the post-rape medical examinations and presence of a rape crisis counselor at the examination.

Video intervention: This condition was identical to the standard services condition in all aspects except for the showing of a 17-min video immediately preceding the examination. The first major component of the video is designed to reduce distress during forensic rape examinations by describing key aspects of the examination, as well as depicting a model undergoing such procedures and successfully coping. This component was based on similar video preparation strategies used to reduce anxiety to anticipated medical procedures such as surgery (e.g., Robertson, Gatchel, & Fowler, 1991). The second component includes psychoeducation about possible reactions to rape with the intention of normalizing these reactions without prescribing them. Among the common reactions described are symptoms of physiological arousal that might be experienced in the hours, days, or weeks following a rape. Information that could be used by victims to effectively cope with future emotional reactions and prevent substance use problems from developing is provided. The video provides information such as guidance on how to avoid high-risk cues, instructions for self-directed graded in vivo exposure exercises to reduce anxiety, methods to recognize and terminate inappropriate avoidance, and strategies to improve mood by maintaining and increasing positive activities. See Resnick et al. (2005) for additional details about the content of the video.

Table 1
Demographics of the standard care and video groups

Demographic	Standard care ($N = 72$)	Video ($N = 68$)	χ^2 or F	p
Mean age (SD)	25.82 (10.32)	25.19 (9.66)	.14	.71
Race				
White	55.6%	45.6%	5.62	.23
Black	40.3%	48.5%		
Asian	1.4%	2.9%		
Hispanic	–	2.9%		
Native American	2.8%	–		
Marital status				
Single	59.7%	58.8%	2.12	.55
Divorced or separated	20.8%	26.5%		
Widowed	5.6%	1.5%		
Married/cohabiting	13.9%	13.2%		

Measures

Subjective units of distress (*SUDs*): Prior to the rape examination, women were asked to rate their current distress on a 0- to 100-point scale, where 0 represents total calm and relaxation and 100 represents extreme emotional distress. The SUDs scale (Wolpe, 1958) is widely used in anxiety research. Psychometric validation is offered by Kaplan, Smith, and Coons (1995), who found the measure highly correlated with more complex self-report indices requiring far more effort to complete, including the State-Trait Anxiety Inventory ($r = .69$) and the Multiple Affect Adjective Checklist ($r = .53$).

Treatment manipulation check: A treatment manipulation check was performed following the intervention using a brief, 9-item quiz that assessed participants' knowledge in areas specifically targeted by the video, including knowledge of common post-rape physical and emotional reactions and patterns of behavior that might facilitate or delay recovery. We included this measure to address the question of whether or not rape victims could attend to and encode new information very soon after their assaults.

Demographic data: At the time of the medical examination, information was gathered about age, race, and marital status.

Post-Traumatic Symptom Scale-Self-Report version (*PSS-SR*): The PSS-SR (Foa et al., 1993) is a 17-item scale that has undergone validation with victims of assault and contains continuous ratings of each of 17 PTSD symptoms. Participants completed the PSS-SR related to the index rape. Each symptom criterion is rated in terms of frequency on a 0 (*not at all*) to 3 (*almost always* or *five or more times per week*) scale. Total scores range from 0 to 51. Foa et al. (1993) reported a coefficient α of .91 for the total scale and a 1-month test–retest reliability of .74. Coefficient α for the current study sample was .91 at both the Time 1 and Time 2 post-rape assessments.

Beck Depression Inventory (*BDI*): The BDI (Beck, Ward, Mendelson, Mock, & Erbaugh, 1961), a 21-item self-report scale, is among the most widely used instruments to measure depression. Each item is scored 0–3 and total scores range from 0 to 63, with higher scores indicating greater depressive severity. Beck and Steer (1984) demonstrated that the BDI has high internal consistency. A modified time frame was used to assess symptoms of depression on that day, specified as "the way you feel today, that is, right now." Coefficient α for the current study sample was .91 at the Time 1 post-rape assessment and .92 at the Time 2 post-rape assessment.

Beck Anxiety Inventory (*BAI*): The BAI (Beck & Steer, 1990) was the only measure administered at three time points. Participants completed the BAI immediately following the forensic examination and at each of the two follow-up assessments (Time 1 and Time 2). This questionnaire is a 21-item self-rating scale of anxiety symptoms. At the post-examination assessment, participants were asked to rate the degree to which they were bothered by each symptom, ranging from 0 (*not at all*) to 3 (*severely*), "right now". At follow-up assessments, participants were asked to use the time reference of "over the past week, including today." Steer, Ranieri, Beck, and Clark (1993) demonstrated the instrument's internal consistency and convergent validity with the Hamilton Anxiety Rating Scale. Coefficient α for the current study sample was .95 at the Time 1 and .96 at the Time 2 post-rape assessment.

Prior history of rape: This assessment used slightly modified questions based on the National Women's Study interview (e.g., see Resnick et al., 1993, p. 986). At the initial assessment interview, following a preface that stated, "Not counting the sexual assault that recently brought you to the hospital" participants were asked "Has another man or boy ever made you have sex by using force or threatening to harm you or someone close to you? Just so there is no mistake, by sex we mean putting a penis in your vagina." A second question asked, "Has anyone ever made you have oral sex by force or threat of harm? Just so there is no mistake, by oral sex we mean that a man or a boy put his penis in your mouth, or someone penetrated your vagina or anus with their mouth or tongue." Two subsequent questions asked about forced anal sex and penetration by fingers or objects. Participants were asked about age of onset of any such incidents. Participants who reported at least one of these types of incidents occurring prior to the recent sexual assault were classified as positive for a prior rape history.

Family Resource Scale (*FRS*): The FRS is a 30-item self-report scale that measures both physical and personal resources including food, shelter, financial resources, health care, and time to be with family and friends (Dunst & Leet, 1987). Respondents answer to what extent each resource is adequate for their family on

a 5-point Likert scale ranging from 1 (*not at all adequate*) to 5 (*almost always adequate*). Dunst and Leet (1987) reported strong internal consistency of the measure (coefficient $\alpha = .92$; split-half reliability $= .95$), and adequate test–retest reliability ($r = .70$). We computed a total score based on 17 items that related strictly to economic resources and that did not refer specifically to children or child care needs, to be consistent for women without children. Coefficient α for the current sample based on the 17-item scale was .91 at the Time 1 and .94 at the Time 2 post-rape assessment.

Procedures

A project coordinator supervised a small team of on-call responders who were available to go to the hospital 24 h per day to administer informed consent and study procedures in cases deemed appropriate as described above. After completion of informed consent, women and girls in either condition were asked to participate in a study evaluating different types of information at the time of the medical examination and how such information might be associated with later functioning. Those in the nonvideo condition were told that they would be given a brief questionnaire and would be asked to rate their anxiety level at two points during the visit. Those in the video condition were told that they would be shown a brief video about the physical examination they would be receiving. In addition, they were told that they would complete a brief questionnaire and rate their anxiety level at two points during the visit.

Immediately prior to the forensic medical examination, and for participants in the video condition, immediately prior to presentation of the video, participants were asked to provide a SUDs rating. Those in the video condition then watched the videotape, followed by the forensic examination, while those in the standard treatment condition proceeded directly to the forensic examination. Immediately after the examination, participants completed a brief assessment that included the BAI (see Resnick et al., 2005). Participants were contacted within the next several days and scheduled for the Time 1 (targeted at 6 weeks post-rape) follow-up interview. Interviews were highly structured and were conducted by a bachelor's level coordinator with several years of experience. The interviewer was blind to treatment condition throughout the course of the study. Women and adolescents were again asked to give informed consent to participate in follow-up assessments, and upon completion of the Time 1 interview and self-report assessment, participants were scheduled for the Time 2 assessment (targeted at 6 months post-rape).

Analyses

There was considerable variability in the post-rape intervals that corresponded to the Time 1 and Time 2 assessments. Defining outliers as values exceeding three standard deviation (SD) units from the mean, the days post-rape for eight cases (two for Time 1 data and six for Time 2 data) were considered so extreme as to not validly reflect the designated timing of follow-up assessments. Scores for these individuals were removed and incomplete data methods (see below) were employed. The remaining 121 participants providing Time 1 data completed that assessment an average of 58.64 days post-rape (SD $= 22.70$; range $= 23$–129; Mdn $= 48$ days). For the 122 participants who provided Time 2 data, assessment was completed in an average of 184.75 days post-rape (SD $= 50.97$; range $= 63$–495; Mdn $= 170$ days). As noted earlier, a total of 140 participants supplied data on one or both assessment occasions.

Descriptive statistics (means and SDs) were obtained for continuous scores on the PSS-SR, BDI, and BAI, as a function of treatment condition, prior rape history, and time of assessment. Hierarchical multiple regression analyses were used to evaluate the effects of the intervention. As previously indicated, in all of these analyses, initial general distress in terms of SUDs score was covaried due to its association with experimental condition. In addition, for each regression analysis, the measure for perceived resources was entered as a covariate due to its association with outcomes. For each equation, the outcome of interest was regressed on the following variables: SUDs and perceived resources, video condition (video vs. nonvideo), prior rape history, and video $\times$ rape history interaction. For all analyses, an absolute value of the critical ratio (the unstandardized parameter estimate divided by its standard error) approaching 2.00 or higher was considered indicative of the associated effect (Jöreskog & Sörbom, 1993). For each of the outcome measures (PSS-SR, BDI, and BAI), effect sizes in the form of partial correlations (Rosenthal, 1991) were also calculated to

indicate the strength of the relations between predictors and outcomes. In line with contemporary thinking about null hypothesis significance testing and the reporting of effect sizes (e.g., Hunter, 1997; Kirk, 1996, 2003; Kline, 2004; Schmidt, 1996; Thompson, 2002), we highlight effects meeting standards set forth by Cohen (1988). Analyses were conducted using Mplus (Muthén & Muthén, 2004a, b) software with full-information maximum likelihood estimation to accommodate incomplete data under the missing-at-random assumption (Little & Rubin, 1987; Rubin, 1987; Schafer, 1997).

Finally, for scores on the three dependent variables (PSS-SR, BDI, and BAI), random coefficients regression (Raudenbush & Bryk, 2002) was used to further characterize the effects of the video intervention on the course of symptom manifestation over the time span covered by the repeated assessments. Using principles of accelerated or cohort sequential longitudinal methodologies (e.g., Bell, 1954; McArdle & Bell, 2000; McArdle, Ferrer-Caja, Hamagami, & Woodcock, 2002; McArdle & Woodcock, 1997), a growth curve describing post-treatment change in each of the dependent variables for each study participant was derived. For these analyses, outcomes of interest are individual slopes for the regression of PTSD, depression, or anxiety on the logarithm of the number of days since the emergency room visit.

Results

Treatment manipulation check

A one-way ANOVA revealed that participants who viewed the video (M = 7.04, SD = 1.26) scored higher on the manipulation check quiz than those who did not view the video (M = 6.33, SD = 1.35), F (1, 106) = 7.88, $p < .01$; however, both groups scored well on this 9-item measure.

Descriptive information

Table 2 contains means and SDs for each of the three dependent measures (PSS-SR, BDI, and BAI).

Findings from regression analyses

The uppermost section of Table 3 provides the results of the hierarchical multiple regression analyses with the PSS-SR as the dependent variable. For Time 1, the covariates were initial SUDs and Time 1 perceived resources; for Time 2, the covariates were initial SUDs and Time 2 perceived resources. Following Cohen's (1988) guidelines for effect sizes, there were small effects for both covariates (−.12, resources, +.13 SUDS). There was a main effect of prior rape history, CR = 3.19 (90% CI for B: 4.05 to 38.09, $r = .26$), with participants who had experienced a prior rape tending to have higher Time 1 PSS-SR scores. However, there was also an interaction between prior rape history and video condition, CR = −3.24 (90% CI for B: −24.66 to −2.81, $r = −.27$), indicating that participants' prior rape history moderated the relation between the video intervention and PSS-SR scores. In this case, for women with a prior rape history in the video condition, the average PSS-SR score was lower than that for women with a prior rape history in the standard care condition, CR = −3.45 (90% CI for B: −18.95 to −2.75, $r = −.28$). In contrast, the difference between the average PSS-SR score for women without a prior rape history and receiving the treatment was less discrepant (and slightly higher) from the average of women without a prior rape history not receiving the treatment (see cell means in Table 2),[2] CR = 1.32 (90% CI for B: −3.50 to 10.87, $r = .11$). In the final equation for Time 2, perceived resources was the only variable that had a reliable relation with PSS-SR scores, CR = −3.84 (90% CI for B: −.45 to −.09, $r = −.31$), with greater perceived resources associated with less PTSD symptomatology.

For the Time 1 BDI analysis (see the middle section of Table 3), perceived resources were inversely related to depression symptoms, CR = −1.42 (90% CI for B: −.30 to –.09, $r = −.12$). Initial SUDs was positively associated with BDI scores at Time 1, CR = 1.79 (90% CI for B: −.03 to .17, $r = .15$), as was prior rape history, CR = 2.39 (90% CI for B: −1.20 to 31.54, $r = .20$). There was a video × rape history interaction, as

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[2]In the 2 × 2 (video × prior rape) configuration for these analyses, each significant interaction effect is interpreted as a significant difference between differences in partialed cell means.

Table 2
Mean PSS-SR, BDI, and BAI scores and standard deviations by condition and assessment point

Condition	ED visit		Time 1 assessment		Time 2 assessment	
	M (SD) Prior rape	M (SD) No prior rape	M (SD) Prior rape	M (SD) No prior rape	M (SD) Prior rape	M (SD) No prior rape
Post-traumatic stress disorder symptom scale						
Video			19.59	23.48	15.85	14.35
	–	–	(9.12)	(12.43)	(10.67)	(12.16)
Nonvideo			28.47	20.13	17.59	14.15
	–	–	(12.22)	(12.08)	(13.01)	(9.95)
Beck Depression Inventory						
Video			16.48	15.80	11.34	12.69
	–	–	(10.23)	(11.93)	(9.44)	(12.50)
Nonvideo			24.74	16.76	14.97	11.80
	–	–	(12.63)	(9.66)	(13.97)	(8.42)
Beck Anxiety Inventory						
Video	25.01	22.20	23.65	24.60	15.24	15.27
	(11.74)	(13.01)	(12.63)	(15.30)	(11.92)	(16.17)
Nonvideo	26.09	21.67	24.19	19.50	18.22	12.95
	(12.48)	(10.45)	(16.03)	(15.06)	(18.52)	(12.86)

Note: The *N*'s for the groups were as follows: Video/prior rape, *N* = 26; Video/no prior rape, *N* = 42; No video/prior rape, *N* = 30; No video/no prior rape, *N* = 42.

Table 3
Hierarchical regression to predict PSS total scores at Time 1, $R^2 = .11$, and Time 2, $R^2 = .13$, ($N = 140$); BDI total scores at Time 1, $R^2 = .11$, and Time 2, $R^2 = .06$ ($N = 140$); and BAI total scores at ED visit, $R^2 = .21$, Time 1, $R^2 = .09$, and Time 2, $R^2 = .09$ ($N = 140$)

Variables	ED visit				Time 1				Time 2			
	B	SE B	CR[a]	ES[b]	B	SE B	CR[a]	ES[b]	B	SE B	CR[a]	ES[b]
Post-traumatic stress disorder symptom scale												
Perceived resources					−.11	.08	−1.39	−.12	−.27	.07	−3.84	−.31
Initial SUDs					.06	.04	1.52	.13	.05	.04	1.33	.11
Prior rape history[c]					21.07	6.61	3.19	.26	5.86	6.28	.93	.08
Video condition[d]					3.602	2.61	1.38	.12	−1.42	2.60	−.54	−.05
Video condition × rape history					−13.74	4.24	−3.24	−.27	−2.56	4.02	−.64	−.05
Beck Depression Inventory												
Perceived resources					−.11	.08	−1.42	−.12	−.15	.07	−2.05	−.17
Initial SUDs					.07	.04	1.79	.15	.04	.04	.96	.08
Prior rape history[c]					15.17	6.36	2.39	.20	8.41	6.29	1.34	.11
Video condition[d]					−.91	2.50	−.36	−.03	−.05	2.59	−.02	.00
Video condition × rape history					−8.70	4.08	−2.13	−.18	−5.05	3.99	−1.27	−.11
Beck Anxiety Inventory												
Perceived resources	–	–	–	–	−.23	.10	−2.31	−.19	−.30	.10	−3.09	−.26
Initial SUDs	.21	.04	5.48	.43	−.02	.05	−.32	−.03	.03	.05	.63	.05
Prior rape history[c]	5.15	6.16	.84	.07	11.30	8.43	1.34	.11	11.04	8.22	1.34	.11
Video condition[d]	−2.34	2.47	−.95	−.08	6.07	3.23	1.83	.16	1.10	3.41	.32	.03
Video condition × rape history	−1.32	3.88	−.34	−.03	−8.68	5.41	−1.60	−.14	−6.13	5.24	−1.17	−.10

[a]CR = critical ratio.
[b]ES = Effect size expressed as a partial correlation.
[c]Prior rape history coding: 0 = no prior rape, 1 = prior rape.
[d]Video condition coding: 0 = did not view video, 1 = viewed video.

well, CR = −2.13 (90% CI for B: −19.19 to –1.81, r = −.18), also with a small to modest effect size. In follow-up comparisons, there was an effect of video condition among women with a prior rape, CR = −2.88 (90% CI for B: −18.89 to −1.04, r = −.24) such that the BDI scores were much lower among those in the video condition; for those in the no prior rape condition, the difference was not significant, CR = −.33 (90% CI for B: −7.26 to –5.60, r = −.03) (see Table 2 cell means). When BDI scores at the Time 2 assessment were analyzed, both initial SUDs and perceived resources were entered as covariates. Perceived resources showed a modest negative relation with Time 2 BDI scores, CR = −2.05 (90% CI for B: −.33 to −.04, r = −.17). There was a main effect of prior rape history, CR = 1.34 (90% CI for B: −7.78 to 24.61, r = .11), but it was qualified by a significant video × prior rape interaction, CR = −1.27 (90% CI for B: −15.33 to −5.23, r = −.11). Follow-up tests indicated that, among participants with a prior rape, those who watched the video had lower BDI scores at Time 2 than did those in the nonvideo condition, CR = −1.54 (90% CI for B: −14.40 to –3.61, r = −.13). Among those without a prior rape, there did not appear to be an effect of video condition, CR = .03 (90% CI for B: −6.22 to 6.37, r = .00)

BAI scores were the next outcome variable examined (see lower portion of Table 3). At the time of the emergency department (ED) visit, there was a significant and large effect of initial SUDs scores, CR = 5.48 (90% CI for B: .11 to .31, r = .43). There were no significant effects for the other predictors. At Time 1, perceived resources had an inverse relation with anxiety scores, CR = −2.31 (90% CI for B: −.48 to –.03, r = −.19). Cohen's standards suggested small to modest effect sizes for a prior rape history, CR = 1.34 (90% CI for B: −10.42 to 33.02, r = .11), video condition, CR = 1.83 (90% CI for B: −2.49 to 14.63, r = .16), and the video × rape history interaction, CR = −1.60 (90% CI for B: −22.62 to –5.27, r = −.14). Follow-up tests for the interaction effect suggest that for women without a prior rape history, there was a modest effect of intervention condition, with higher BAI scores in the video condition, CR = 1.71 (90% CI for B: −3.03 to 14.89, r = .15). In contrast, among women with a prior rape history, there did not appear to be an effect for intervention condition, CR = −.67 (90% CI for B: −13.71 to –8.04, r = .06) (Table 2). Time 2 BAI scores were examined next, with perceived resources and initial SUDs entered as covariates. Resources demonstrated a negative relation with Time 2 BAI scores and with a modest effect size, CR = −3.09 (90% CI for B: −.54 to −.05, r = −.26). None of the other variables was associated with BAI scores by either the CR or Cohen's criteria.

Findings from growth curve analyses

As noted previously, there was considerable variation in the timing of assessments around the designated 6-week and 6-month target dates. For the growth curve analyses, an accelerated longitudinal methodology capitalized on this diversity in timing by linking each person's available information on individual change to describe the progression of symptom severity in the sample over the full range, from the earliest assessment for a given variable to the last assessment for that variable. In this approach, the maximum likelihood principle is invoked such that a best estimate of the course of symptom severity for each participant over the full range of days is derived; under the usual statistical assumptions, parameters most likely to have produced the data given the model are estimated. In the end, the goal was to estimate the trend for each participant from the available data (1, 2, or 3 assessments per participant) and then identify predictors of the trend. For all three dependent variables (scores on the PSS-SR, BDI, and BAI), each participant had two outcomes or individual differences characteristics: an intercept, an estimate of her status on the variable just after exposure, and a slope, an estimate of her rate of change in symptom severity over the course of the study. The model was the one in which the predictors of intercept and slope were the covariates of initial SUDs and perceived resources, the intervention (video vs. nonvideo), prior rape history, and the video × rape history interaction.

As before, using a CR or *t*-value approaching a value of 2.00 or Cohen's effect size standards as guidelines, one small to modest effect on change in symptom severity involving the treatment was found (see Table 4). With regard to PTSD (PSS-SR scores), slope or rate of change after the ED visit was associated with the interaction between treatment and prior rape history, B = 5.16, SE B = 3.42, CR = 1.51, df = 126, r = .13. Fig. 2 depicts the nature of this interaction, with the trend lines (originating at 23 days post-ED visit, the point at which the first PSS-SR score was generated, representing predicted average trajectories of symptom severity for each of the four conditions. As shown, at day 23, the average predicted PSS-SR scores for the four groups

Table 4
Multilevel regression predicting PSS-SR total scores as a function of video condition and prior rape history

Variable	Time 1			
	B	SE B	CR[a]	df
For predicting intercept				
Intercept	39.41	7.10	5.55	226
Initial SUDs	.01	.13	.05	226
Perceived resources	.60	.28	2.15	226
Rape history[b]	11.32	10.63	1.07	226
Video condition[c]	12.33	10.88	1.13	226
Video condition × rape history	−31.65	16.05	−1.97	226
For predicting slope				
Intercept	−4.68	1.48	−3.17	126
Initial SUDs	.01	.03	.43	126
Perceived resources	−.17	.06	−2.83	126
Rape history[b]	−1.24	2.20	−.56	126
Video condition[c]	−2.54	2.30	−1.10	126
Video condition × rape history	5.16	3.42	1.51	126

Note: The random effect for the slope coefficient was fixed to achieve identification of the model.
[a]CR = critical ratio.
[b]Prior rape history coding: 0 = no prior rape, 1 = prior rape.
[c]Video condition coding: 0 = did not view video, 1 = viewed video.
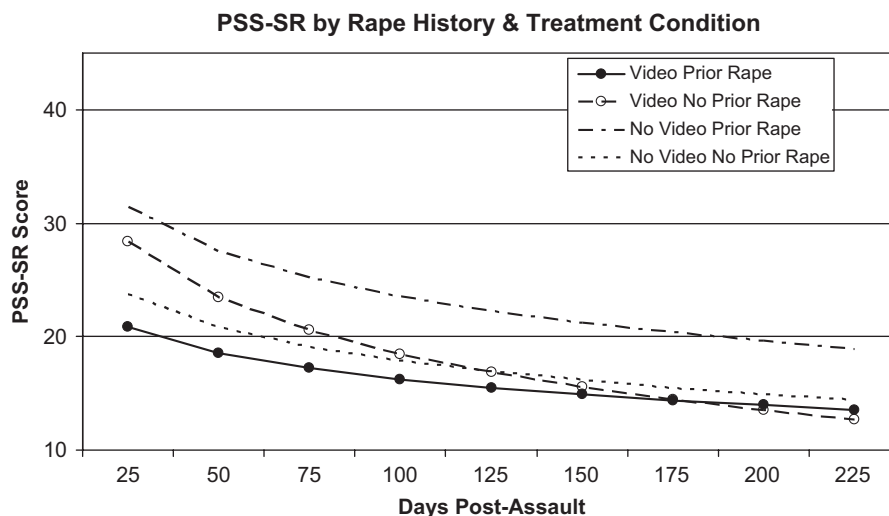

Fig. 2. Progression of PTSD symptom severity over time by treatment condition and prior history of rape.

demonstrated a reasonable amount of dispersion. The average PSS-SR score for women with vs. without a prior rape history in the video condition was 21.04 and 29.10, whereas the average for women with vs. without a prior rape history in the standard care condition was 32.16 and 24.74. At day 59, which is the mean number of days post-emergency room for all Time 1 assessments, the average predicted PSS-SR score for women with vs. without a prior rape history in the video condition was 17.14 and 22.30, whereas the average for women with vs. without a prior rape history in the standard care condition was 26.58 and 20.37. Note that these are predicted average scores using functions that represent the best fit to the full data, given the maximum likelihood criterion. The order of the magnitude of average PSS-SR scores at both 23 and 59 days is exactly the same as the order of magnitude of PSS-SR means reported in Table 2. Moreover, the predicted average values for group means in Fig. 2 at 59 days are quite similar to the Time 1 means reported in Table 2.

As a supplement to the multiple regression analyses, the growth curve strategy offers the opportunity to visualize an average continuous trajectory of the course of symptom severity. As shown in Fig. 2, women without a prior rape history in the video condition have the steepest decline in symptom severity across time. The trajectory for this group overtakes that of the group of women without a prior rape history in the standard care condition at approximately 128 days, and that of the group of women with a prior rape history and receiving the treatment at about 181 days (or 6 months). For women with a history of prior rape, the initial and longer-term effect of the video is quite apparent. For women without a history of prior rape, the video effect is less obvious and less dramatic. It should be noted, however, that over the course of time, women in the two video conditions are predicted to be less symptomatic than those in the two nonvideo conditions, when contrasted to nonvideo group women with a prior rape history and by a narrow gap when contrasted against nonvideo group women without a prior rape history.

Discussion

Early interventions that facilitate mental health recovery in the aftermath of rape and other forms of violent crime have the potential to be enormously valuable. Brief, technologically based interventions are of particular interest because they are inexpensive, highly transportable, easily standardized and administered, as well as easily tailored to the needs of specific individuals. The 17-min video intervention described here was delivered immediately prior to the post-rape medical examination and appeared to accelerate psychological recovery among those with a prior history of rape.

General findings

Overall, and irrespective of treatment condition, higher initial distress was a risk factor for PTSD symptoms at Time 1, and history of prior rape was a risk factor for depression, PTSD, and anxiety at Time 1. Perceptions that one's resources were limited was associated with elevated symptoms of depression and anxiety at Time 1 and with symptoms of PTSD, depression and anxiety at Time 2. The significant associations observed between resources in the aftermath of assault and symptom intensity over time are consistent with results of other studies that have identified lower economic resources or social support as risk factors or correlates associated with poorer adjustment following exposure to traumatic events (Brewin et al., 2000; Ozer et al., 2003).

As can be seen in mean descriptive data from the regression (Table 2) and growth curve analyses, scores on symptom measures were well within the mild distress range or below clinical cutoff criteria at the Time 2 assessment for each treatment group (Beck & Steer, 1990; Beck et al., 1961; Foa et al., 1999) and were comparable to post-treatment scores observed in prior randomized controlled treatment studies with rape victims (Foa et al., 1999; Foa, Olasov Rothbaum, Riggs, & Murdock, 1991; Resick, Nishith, Weaver, Astin, & Feuer, 2002).

Findings among those with a prior history of assault

Positive effects of the video in terms of reduced frequency of PTSD symptoms were observed at initial post-rape assessment. The same pattern of findings was observed for symptoms of depression at Time 1, and with a smaller associated effect size at Time 2. Growth curve analyses also yielded a consistent pattern of findings over time in that PTSD symptom scores were lower among women with a prior history of rape who saw the video. Thus, similar to previous findings reported by Foa et al. (1995, 2006) regarding the impact of a multi-session CBT treatment implemented approximately 1 month post-assault to prevent PTSD and other mental health sequelae, the video was associated with accelerated recovery and relatively shorter-term post-event impact. However, in this study, this short-term outcome was observed only among women with a prior history of rape.

It has been suggested that brief, early interventions based on cognitive and behavioral treatment strategies that target high-risk groups may be useful (Bonanno, 2004; Bryant, Harvey, Dang, Sackville, & Basten., 1998; Bryant, Sackville, Dang, Moulds, & Guthrie, 1999; Foa et al., 1995; NIMH, 2002). Research indicates that victims of multiple sexual assaults or other traumatic events are at increased risk of developing PTSD (Brewin

et al., 2000; Resnick, Yehuda, Pitman, & Foy, 1995; Steketee & Foa, 1987), and within the subgroup with a prior history of rape, the effects of this very brief, early treatment, though small to moderate, were consistent and in the direction of accelerating recovery. We cannot rule out alternative hypotheses as to why the intervention may have been more effective among women with a prior history of rape. In addition to increased vulnerability within this group and possible greater range and room for recovery on outcome measures, it is possible that having prior experience with rape made the information provided more understandable or relatable.

Findings among those with no prior history of assault

The pattern of findings differed for women without a prior history of rape. Specifically, with regard to PTSD and general anxiety symptoms, there were small effects indicating greater frequency of symptoms at Time 1 among those in the video vs. standard care group. Growth curve analyses indicated a similar pattern such that among women without a prior history of rape, PTSD symptom frequency was higher for those in the video condition than for those in the nonvideo condition at earlier, but not later, post-rape assessments.

The observed differential efficacy raises a question of whether or not this treatment should be offered to those without a prior history of rape in the acute phase. Bonanno (2004), among others, makes a compelling argument against global applications of interventions to individuals exposed to traumatic events on the basis that natural resilience may be compromised by such efforts, and findings related to debriefing interventions have been mixed, with results of some studies indicating poorer long-term functioning among those receiving treatment (Rose, Bisson, & Wessely, 2001).

Statistically, the negative effects observed among the group with no prior history of rape were small in magnitude and unlike negative findings related to debriefing they were observed at shorter-term rather than longer-term assessment. In addition, prior reports related to the video have indicated positive effects within the full sample in terms of reduced marijuana abuse (Acierno et al., 2003). Future research is needed to examine whether the moderating effect of a prior rape history is a reliable finding or whether there are benefits or risks not adequately captured in the current study. If warranted, it is possible that screening for a prior history of rape or other known risk factors could first be conducted to determine who should receive this type of intervention.

Additional research is needed to evaluate whether psychoeducation and modeling strategies addressing CBT components may be usefully implemented at early time points following exposure to potentially traumatic events. In referring to exposure therapy, Ehlers and Clark (2003) point out that "Empirical studies will need to clarify the optimal time point for intervention" (p. 823). This question is relevant in relation to an intervention such as the video that includes *modeling* of upcoming medical procedures as well as modeling of in vivo exposure procedures that might be helpful in the days and weeks post-rape.

Limitations to the study include the relatively small sample size, and the limited number of assessments that may pose threats to the validity and generalizability of findings. In addition, a subset of the nonvideo group was recruited prior to the existence of the video and was not randomly assigned; however, findings were the same when randomized participants were isolated for analysis. A further limitation was that project assistants conducting initial recruitment and procedures were not blind to condition at the time of recruitment. Future research should delay randomization of participants until after the recruitment. Although our group sizes compare well with some other early intervention and treatment studies (e.g., Foa et al., 1995, 1999), our intervention is very brief and would benefit by evaluation within larger samples to increase power to detect potential effects. On the other hand, we were able to obtain follow-up data from approximately 70% of consecutively recruited rape victims presenting for services acutely post-rape. In addition, data indicated that those assessed at follow-up did not differ on demographics from those we failed to re-assess. The use of maximum likelihood-based incomplete data strategies allowed us to retain the full sample for analyses over the full course of follow-up. Thus, we believe that our sample is representative of women coming in for acute post-rape care, at least in similar geographic regions.

Future studies should include more careful assessment of comprehension of content and retention of knowledge delivered in the video by rape victims at the time of treatment delivery. Our assessment of knowledge of content of the intervention was not particularly sensitive as evidenced by relatively high scores

on the measure observed in both the video and nonvideo groups. An improved treatment manipulation check that highlights learning differences between those in the video and nonvideo conditions might also help to identify critical components of the intervention that might relate to recovery. We cannot infer whether some specific components of the intervention may have been more helpful than others based on our data.

Future research should also include a time- and attention-control condition that would allow for better evaluation of whether specific content in the video is helpful to rape victims. More in-depth baseline assessment using multiple standardized measures of distress prior to showing the video would have also allowed for greater control for individual differences in evaluating efficacy of the video. Inclusion of assessment of behaviors such as exposure to nondangerous rape-related cues over the course of follow-up intervals would also help to identify possible modes of action of the intervention. In addition, future studies should control more carefully for receipt of additional mental health treatment in terms of frequency, duration, and content of treatment and to evaluate the unique effects of the brief intervention and its association with more formal treatment seeking. Replication of these findings is necessary to determine whether this intervention might be usefully implemented soon after a rape victimization to prevent negative mental health consequences and whether such an intervention should be delivered to all such rape victims. If shown to be efficacious, this type of intervention might also be useful for male sexual assault victims.

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